

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Adolph, Horst G.

Serial No. 09/853,927

Group Art Unit: 3641

Filed: May 9, 2001

For: HYDROLYZABLE
PREPOLYMER FOR EXPLOSIVE AND
PROPELLANT BINDERS

Examiner: Aileen Felton

DECLARATION UNDER RULE 1.132

I, Horst G. Adolph, do hereby declare and say as follows:

I possess a Dr. rer.nat in organic chemistry from Tuebingen University, Germany. I have more than 40 years experience in researching and developing ingredients for explosives and propellants, including oxidizers, plasticizers, and polymers for binder use. I am an inventor on over 50 U.S. patents, including several specifically cited by the former examiner as prior art regarding this application. I am also a named inventor on the present application.

Being a listed inventor in the above referenced patent application as well as numerous other patents in the field at issue, I am extremely familiar with both the present invention and the prior art in the pertinent technology area. Also, as a result of my training and work experience noted above, I am intimately familiar with polymer technology, particularly as it relates to explosive and propellant binders.

While it is known that formals are hydrolysable and that formals can be made from alcohols by acid catalyzed condensation with formaldehyde, it does not follow that the application of this knowledge to "diols", i.e. difunctional alcohols which may be either

monomeric, or oligomeric, or polymeric, will produce a hydrolysable prepolymer suitable for use as a binder in energetic compositions for the following reasons.

First, when attempting to produce formals from various diols, some diols form cyclic formals, mixtures of linear and cyclic formals, or polymers with a broad molecular weight distribution. None of these configurations would be suitable for use as binders. Thus, the particular structure of the diol of the present invention is extremely important.

Second, it is disclosed in the literature of the art that diols can be linked by numerous hydrolysable groups such as carbonate --OC(=O)-- , thiocarbonate --OC(=S)O-- , iminocarbonate --OC(=NH)O-- , orthoformate --OCH(OR)O-- , and acetal --OCH(R)O-- to name a few. However, merely because these groups are hydrolysable and they can be used to link diols, does not mean that they can be used to form a hydrolysable prepolymer useable as a binder. Use of said groups have proven unsuitable due to poor thermal stability, incompatibility with energetic ingredients, or hydrolysis conditions not suitable for energetic compositions (such as the necessity of harsh solvents or high temperatures and/or pressures).

Therefore, as one with significant experience in the art, based upon the numerous options of hydrolysable moieties available as well as the numerous potential conflicts with different diol structures, it would not be obvious to select the particular formal, linked with the particular diol of the present invention to create a hydrolysable prepolymer compatible with energetic materials and hydrolysable under reasonable conditions such as the present invention, merely based upon knowledge that formal groups are hydrolysable and can be used in a particular monomer that is not related to prepolymers used with energetic binders.

All statements made herein are of my own knowledge are true and that all statements made on information and belief are believed to be true; and, further, I understand that these

statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Horst G. Adolph
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Date: July 1, 2004